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10/594,444	09/26/2006	Kenichi Maruhashi	Q97384	6862

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EXAMINER	
WANG-HURST, KATHY W	
ART UNIT	**PAPER NUMBER**
2617	

NOTIFICATION DATE	DELIVERY MODE
11/16/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/594,444	MARUHASHI ET AL.	
	Examiner	Art Unit	
	KATHY WANG-HURST	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-46 and 48-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-46 and 48-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on 8/27/2009 has been entered. Claims 51 is added. Claims 22-46, 48-51 are still pending in this application.

Response to Arguments

1. Applicant's arguments filed 8/27/2009 have been fully considered but they are not persuasive.

Regarding the applicant's argument that the combination of Ling and Rappaport does not teach or suggest the claimed propagation detecting means and symbol rate setting means (see Remarks page 17), the examiner respectfully disagrees. Ling discusses determining the characteristics of the communication link and adjusting the processing such as encoding and modulation of data to be transmitted based on the determined the communication link ([0022][0023][0030][0031][0035]). Ling discusses adjusting bit rate based on the condition of communication link but does not specifically discuss symbol rate. Rappaport is brought to show that setting and selecting symbol rate based on the detected propagating state it well known in the art ([0045]). Therefore the combination of Ling and Rappaport does teach or suggest the claimed propagation detecting means and symbol rate setting means.

Regarding the applicant's argument that Rappaport does not teach or suggest a mechanism to link the propagating state and the symbol rate (see Remarks page 18), the examiner respectfully disagrees. Rappaport discusses an automated determination of desirable configuration settings, such as symbol rate setting, based on real time radio

frequency environmental conditions ([0045]). In other words, there is a direct relationship between the symbol rate setting and the propagating environment. Therefore Rappaport does teach or suggest a mechanism to link the propagating state and the symbol rate.

Regarding the applicant's argument that the combination of Ling and Rappaport does not teach or suggest adjusting the symbol rate using the propagating state representative of an intensity of the multipath (see Remarks page 19), the examiner respectfully disagrees. Ling discusses factors such as different fading and multipath effects deteriorate communication link conditions and adjusting information bit rate to combat communication link deterioration ([0035]). Rappaport discusses an automated determination of desirable configuration settings, such as symbol rate setting, based on real time radio frequency environmental conditions ([0045]). Therefore the combination of Ling and Rappaport does teach or suggest adjusting the symbol rate using the propagating state representative of an intensity of the multipath.

Concerning the applicant's arguments regarding combination of references, both of the references are from the same field, i.e. communication systems and concern analogous topics. Therefore, the examiner contends that the references would be combinable to one skilled in the art.

Considering the applicant's arguments on the dependent claims (see Remarks page 20), i.e. varying number of transmitting circuit means, directo or indirect modulation and transmission frequency of 10GHz, Ling, Rappaport, Kadous, Ashby and Santhoff in combination show these features.

Regarding new claim 51, the claimed features are addressed in the following claim rejections.

Therefore, the argued limitations read upon the cited references or are written broad such that they read upon the cited references, as follow.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 22-31, 34, 37, 39, 41-46, 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. (US 2004/0165558) in view of Rappaport (US 2004/0143428).

Regarding claim 22 and 49, Ling discloses a radio communications device ([0019]) comprising: a transmitter (Fig. 1 and [0022]) comprising: a plurality of transmission antennas for radiating radio waves based on transmission RF signals (Fig. 1 items 124A-124T); a plurality of transmitting circuit means for supplying the transmission RF signals to said plurality of the transmission antennas, respectively, based on a plurality of transmission signals (Fig. 1 items 122a-122T, 120, 132 and 114 and [0022][0023]); and transmission signal processing means comprising modulating means, for modulating input transmission data to generate said plurality of the transmission signals by using said modulating means ([0022][0023]), and for outputting the modulated plurality of the transmission signals to said plurality of the transmitting

circuit means ([0022][0023]); a receiver (Fig. 1) comprising: a plurality of reception antennas for receiving the radio waves transmitted by the plurality of the transmission antennas and outputting reception RF signals based on the received radio waves (Fig. 1 items 152A-152R); a plurality of receiving circuit means for outputting reception signals based on said reception RF signals output respectively from by said plurality of the reception antennas (see e.g. Fig. 1 item 154A-154R, 156, 162 and 158 and [0034][0035]); and reception signal processing means comprising demodulating means([0034]), for demodulating the reception signals output respectively from said plurality of the receiving circuit means by using said demodulating means to generate reception data ([0034][0035]); propagation detecting means for detecting a propagating state of said radio waves received by said plurality of the reception antennas ([0022]-[0023]); and coding and modulation schemes setting means for selecting a coding and modulation scheme ([0031][0035][0040]), to be used during modulation and demodulation, from a plurality of coding and modulation schemes based on the detected propagating state ([0035][0041]), and for setting the selected coding and modulation schemes in said modulating means and said demodulating means.

Ling discloses setting and selecting coding and modulation schemes but does not explicitly disclose setting and selecting symbol rate based on the detected propagating state. In an analogous art, Rappaport teaches setting and selecting symbol rate based on the detected propagating state ([0045]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling, to adjust various

settings such as symbol rates to achieve identified performance goals for the communication network, as taught by Rappaport, thus facilitating the automated determination of desirable configuration setting for the wireless transceivers ([0045]).

Regarding claim 23, Ling discloses a radio communications device comprising: a transmitter (Fig. 1 and [0022]) comprising: a plurality of transmission antennas for radiating radio waves based on transmission RF signals (Fig. 1 items 124A-124T); a plurality of transmitting circuit means for supplying the transmission RF signals to said plurality of the transmission antennas, respectively, based on a plurality of transmission signals (Fig. 1 items 122a-122T, 120, 132 and 114 and [0022][0023]); and transmission signal processing means comprising a plurality of modulating means having respective different modulating schemes ([0040][0041]), for modulating input transmission data to generate said plurality of the transmission signals by using a selected one of said plurality of the modulating means ([0040][0041]), and for outputting the transmission signals to said transmitting circuit means ([0040][0041]); a receiver (Fig. 1) comprising: a plurality of reception antennas for receiving the radio waves transmitted by the plurality of the transmission antennas and outputting reception RF signals based on the received radio waves (Fig. 1 items 152A-152R); a plurality of receiving circuit means for outputting reception signals based on said reception RF signals output respectively from by said plurality of the reception antennas (see e.g. Fig. 1 item 154A-154R, 156, 162 and 158 and [0034][0035]); and reception signal processing means having a plurality of demodulating means comprising respective different demodulation schemes ([0021]), for demodulating the reception signals output respectively by said plurality of the

receiving circuit means by using a selected one of said plurality of the demodulating means to generate reception data ([0034][0070]); propagation detecting means for detecting a propagating state of said received radio waves ([0022][0023]); and modulating means/demodulating means selecting means for selecting one of said modulating means and one of said demodulating means for modulating the input transmission data and for demodulating the reception signals, respectively ([0030][0031][0035][0040]), based on the detected propagating state ([0023][0031]).

Regarding claim 51, Ling discloses a radio communication device comprising:
a plurality of modulating means for modulating transmission data to generate a plurality of transmission signals ([0022][0023][0030][0031] modulation means);
a plurality of transmission means for supplying, based on said plurality of transmission signals, transmission RF signals to a plurality of transmission antennas, wherein said plurality of transmission antennas radiate radio waves based on the transmission RF signals ([0032][0033][0035] transmission means); and
a plurality of demodulating means for demodulating reception signals based on reception RF signals output from reception antennas that have received the radio waves from the plurality of the transmission antennas, to generate reception data, wherein the reception antennas output the reception RF signals based on the received radio waves ([0034][0070][0071] demodulating means),
wherein a first symbol rate in said plurality of modulating means and a second symbol rate in said plurality of demodulating means are set based on an intensity of the multipath interference which is determined based on a propagating state of the radio

waves ([0006][0035][0060] multipath causing degradation of the propagating signals and adjusting transmission rate based on propagating state).

Regarding claims 24 and 25 and 48, Ling discloses the radio communications device according to claim 22 and 23 respectively, wherein said received propagation detecting means detects the propagating state of said radio waves according to at least one of the following: the level of a reception electric power level of said received radio waves, a transmission error rate, a retransmission rate, or a channel matrix estimated in a spatial multiplexing process ([0035]).

Regarding claim 26 and 28, combination of Ling and Rappaport discloses setting various data processing parameters such as symbol rate and modulation schemes based on the propagating state detected by said propagation detecting means.

Regarding claim 27 and 29 and 34, Ling discloses adjusting data processing parameters such as code and modulation schemes due to multipath effects ([0035]).

Regarding claim 30 and 31, combination of Ling and Rappaport discloses adjusting modulation schemes in order to increase or decrease symbol rates.

Regarding claim 37, Ling discloses the radio communications device according to claim 34, wherein said control means instructs said modulating means and said demodulating means to select any one of modulating and demodulating processes including ASK, BPSK, FSK, QPSK, and DQPSK ([0040][0041]) and to use one of said plurality of transmitting circuit means and one of said plurality of receiving circuit means, respectively, when it is determined that the interference is weak (noise is low from SNR), and instructs said modulating means and said demodulating means to select

either of modulating and demodulating processes including multivalued PSK and multivalued QAM and to use said plurality of transmitting circuit means and said plurality of receiving circuit means, respectively, when it is determined that the interference is strong (noise is high from SNR) ([0021][0022]).

Regarding claim 39, combination of Ling and Rappaport discloses the radio communications device according to claim 22, wherein said transmission antennas and said reception antennas are shared.

Regarding claim 45 and 46, Ling discloses the radio communications device of claim 22, wherein the propagation detecting means receives as input a channel matrix based on the reception signals, a reception level of the reception signals, and a bit error rate of the reception signals, and detects the propagating state of the received radio waves based on the received input ([0011][0030][0040]).

Claim 41 is rejected on the same grounds as claim 22.

Claim 42 is rejected on the same grounds as claim 22.

Claim 43 is rejected on the same grounds as claim 23.

Claim 44 is rejected on the same grounds as claim 23.

Claim 50 is rejected on the same grounds as claim 22.

3. Claims 32, 33 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling, in view of Rappaport, further in view of Kadous et al. (US 2005/0075073).

Regarding claims 32, 33 and 38, combination of Ling and Rappaport discloses varying data transmission rate based on channel condition but fails to disclose varying the number of transmitting circuit means used according to the channel condition.

Kadous teaches varying the number of transmitting circuit means used according to the channel condition ([0009]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling in view of Rappaport, to turn off transmit antennas depending on the data rate, as taught by Kadous, thus reducing interference by turning off the undesirable transmit means ([0009]).

4. Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling in view of Rappaport, further in view of Ashby (US 5861781).

Regarding claims 35 and 36, Ling in view of Rappaport discloses varying modulation and demodulation schemes to achieve optimal performance, but fails to disclose employing direct or indirect modulation to achieve optimal performance.

Ashby teaches employing direct or indirect modulation to achieve optimal performance (col. 1 lines 24-45, choosing indirect modulation over direction modulation; and col. 2 lines 44-55; col. 4 lines 29-43).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling in view of Rappaport, to apply different modulation mechanisms to process the signals, as taught by Ashby, thus improving the accuracy of the phase shift (col. 1, lines 24-45).

5. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ling in view of Rappaport, further in view of Santhoff et al. (US 2005/0058114).

Regarding claim 40, Ling in view of Rappaport discloses the radio waves radiated by a plurality of transmission antennas but fails to explicitly disclose the radio waves radiated by a plurality of transmission antennas having a frequency of 10GHz.

Santhoff teaches the radio waves radiated by a plurality of transmission antennas having a frequency of 10GHz ([0081][0082]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling in view of Rappaport, to transmit at a higher radio frequency range that extends up to 10 GHz, as taught by Santhoff, thus utilizing significantly larger contiguous portions of the radio frequency spectrum ([0082]).

Conclusion

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATHY WANG-HURST whose telephone number is (571) 270-5371. The examiner can normally be reached on Monday-Thursday, 7:30am-5pm, alternate Fridays, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nick Corsaro can be reached on (571) 272-7876. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KATHY WANG-HURST/
Examiner, Art Unit 2617

/NICK CORSARO/
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